



THE JHARKHAND GAZETTE

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Urban development & housing department

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6 September, 2018

Memo No: SUDA/SBM/SWM/ Sanitation Plan/ 12/2018-4544--

Subject: Jharkhand State Urban Sanitation Policy – 2018

Brief Name & Implementation:

- I. This Policy will be called as “Jharkhand State Urban Sanitation Policy – 2018”.
- II. This policy will be with effective from the date of notification.
- III. This policy will be applicable for all Urban Local Bodies of the Jharkhand State.

CHAPTER 1

NEED FOR STATE SANITATION POLICY

1.1 Introduction

Inadequate sanitation causes India considerable economic losses, equivalent to 6.4 per cent of India's GDP in 2006 at US\$53.8 billion (Rs.2.4 trillion), according to The Economic Impacts of Inadequate Sanitation in India, a report from the Water and Sanitation Program. The study analyzed the evidence on the adverse economic impacts of inadequate sanitation, which include costs associated with death and disease, accessing and treating water, and losses in education, productivity, time, and tourism. The findings are based on 2006 figures, although a similar magnitude of losses is likely in later years.

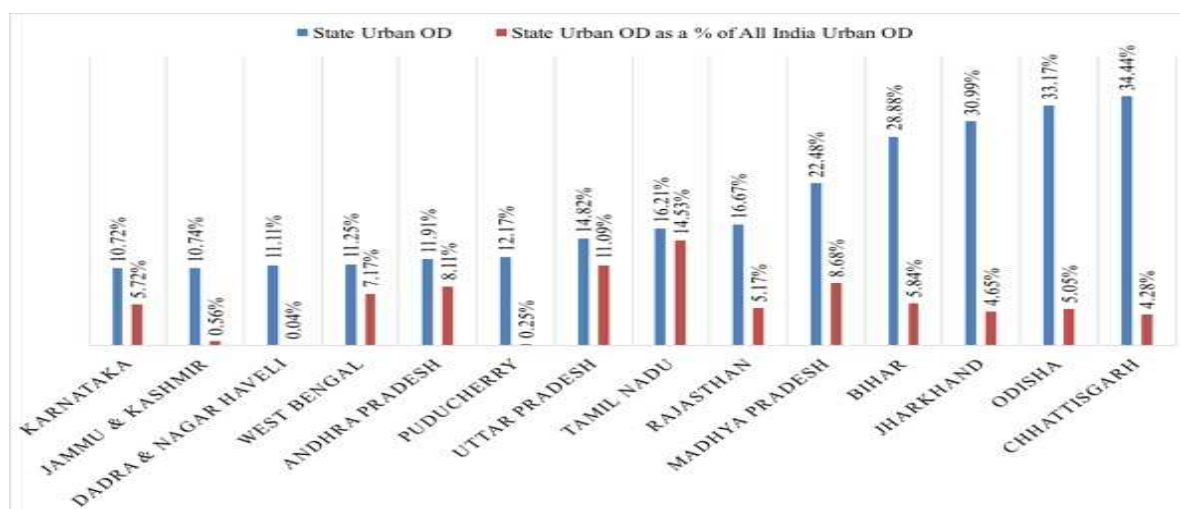
The recent report True cost of sanitation was published jointly by the LIXIL Group Corporation, Water Aid and Oxford Economics recently. The economic burden of poor sanitation is the heaviest in Asia-Pacific, which is almost 77 per cent of the total amount. Latin America and the Caribbean and Africa each account for approximately 10 per cent of the global cost.

On a national level, in terms of total cost, India suffers the most, with US \$ 106.7 billion wiped off the GDP in 2015. It is almost half of the total global losses and 5.2 per cent of the nation's GDP.

Steps by Indian Government

The importance of the State Sanitation Policy may be understood with the few of the steps taken by the National level government for the last 10 years. Jharkhand government do realizes the importance of sanitation at all the levels and therefore it is committed to have healthy sanitation practices in both the rural and the urban area.

The first step taken by the national government in 2011 and the Census of India released household level sanitation data for the country. While this will be detailed under the situational analysis section, at the outset it is important to point out that Jharkhand State Urban OD as a percentage to the national OD is not high but when we take the figure of the top three states contributing to urban open defecation in the country as per the 2011 census; the three states are Jharkhand, Odisha and Chhattisgarh.



Source: Census of India 2011, CPR analysis

The second major step was taken on 2nd October 2014, when the Government of India launched the Swachh Bharat Mission (SBM) in urban and rural areas of India with a vision to ensure hygiene, waste management and sanitation across the nation. In his address to both houses of Parliament in May 2014, the Hon'ble President of India stated that "**Swachhata is an article of faith for my government.** Swachhata will have an overarching impact on the quality of life and wellbeing of a person, particularly the poor. Swachh Bharat Mission has been launched to achieve a Clean and Open Defecation Free India and scientifically managed municipal solid waste by October 2019".

The third step by the government was when in September 2015, India became signatory to the Sustainable Development Goals (SDGs). Goal 6 demands universal access to clean water and sanitation. Within this, Target 6.2 aims at achieving ***access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations***. The SDGs are a follow-up to the Millennium Development Goals (MDGs), which aimed at extending improved sanitation coverage to the unserved households. The difference between the SDGs and the MDGs is that where the latter focused on household-level infrastructure provision within an understanding of “improved sanitation”, the SDGs cover the whole sanitation service chain, infrastructure and service provision, and aim to mitigate the adverse effects of public health due to poor sanitation.

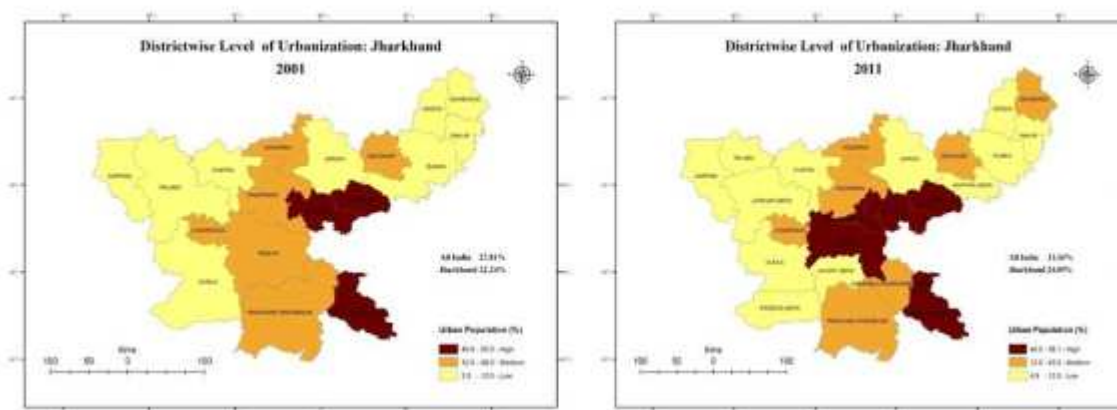
Finally to summarize it may be stated that while sewerage has been the traditional response to household and city- based sanitation needs, there is a growing realization that depending on it as the only solution for sanitation negates the existing non-networked, on-site sanitation prevalent in the state, and for which strategies need to be devised.

These four developments have prompted the State Government to develop a state sanitation policy in line with the national and international goals, both for infrastructure and services provision, as well as behavior change and capacity development of cities for sanitation service delivery and scientific management of municipal solid waste.

1.2 Uneven spread of Urbanization in the state

With a total population of 329.66 million, Jharkhand comprises 2.72% of the country’s total population. The 2011 census recorded an urban population of 7.9 million, corresponding to 24.05% of the total population of 32.9 million. While Jharkhand’s urbanization rate is below the national average, it is projected to catch-up in the next 15 years. At present, Jharkhand has 43 urban local bodies (ULBs) with a total population of 5.26 million (2011 Census). They include six Municipal Corporations, nineteen Municipal Councils, fifteen Nagar Panchayats, two Notified Area Committees, and one Municipality. ULBs have the statutory responsibility to provide civic and infrastructure services in areas under their jurisdiction. Citizen engagement has been minimal; and municipal elections were held in 2008 after 22 years.

The rate of urbanization has increased after the formation of Jharkhand as a separate state (carved out of Bihar) in 2000 under Bihar Reorganization Act, which has given an economic and administrative boost to the cities. The regional patterns of urbanization in the state portray an interesting picture with wide variations in the levels of urbanization across districts as exhibited between 2001 and 2011. Previously conducted studies indicate a direct relationship between the spatial distribution of the urban population and the major industrial nodes of the state such as the districts of Ranchi, Dhanbad, Bokaro, Jamshedpur etc. An additional factor that contributes to Ranchi leading the urban landscape in the state is its administrative importance given the status of the capital city post the formation of Jharkhand as a separate state in 2000.



1.3 Service level In Jharkhand

Service levels in urban areas. With rapidly increasing population, Jharkhand's major cities face vast challenges in managing urbanization to meet the growing demands for infrastructure and services. There is relatively poor level of access to basic services. A summary of the status of basic infrastructure in ULBs is as follows:

- (i) Sewerage/Sanitation: Sewerage network coverage in the State is only about 16%, and 44% of households have individual toilets. Sewerage facility is available in few pockets in Ranchi and also exist in privately managed industrial townships of Jamshedpur and Bokaro. None of the other cities in Jharkhand have sewer networks or treatment facilities. Only about 20% of the total wastewater generated is treated. Most urban households depend on septic tanks,
- (ii) Faecal Sludge & Septage Management: Presently the faecal sludge management is very limited in Jharkhand. The Faecal Sludge & Septage Management policy was made in the state and same is under implementation.
- (iii) Waste Water Use: Presently the waste water reuse is very limited in Jharkhand. The waste water recycling policy was made in the state and same is under implementation.
- (iv) Solid Waste Management (SWM): The coverage and quality of SWM in urban areas of Jharkhand are not fully managed. Waste transport from secondary storage sites has improved and in few cities the waste processing has already been initiated, scientific waste management of the landfill sites is also under implementation in selected cities.

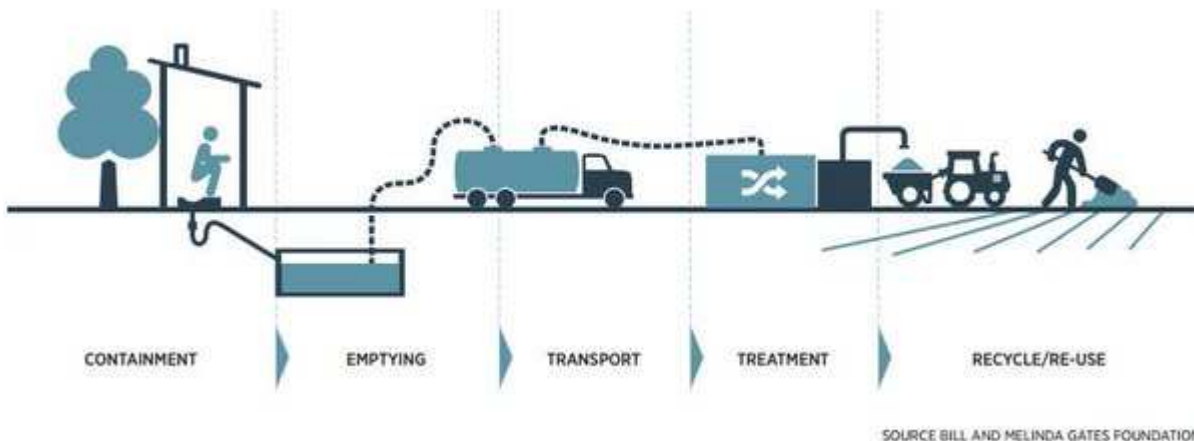
The Census (2011) data on the urban water and sanitation situation in Jharkhand provides a somewhat dismal picture: it indicates that access to safe drinking water is a major issue for almost half the urban households as only 27 percent have access to treated tap water for drinking and less than 27 percent have sources within their premises. In the case of sanitation, more than 56 percent of the urban households do not have access to toilets – a marginal 5 percent improvement over the decade- and only a little over a 58 percent have water closets, with the remaining using pit or other kind of toilets.

1.4 The full sanitation value chain needs to be covered

Rates of open defecation do not tell the whole story. If the full sanitation value chain is examined, then ***the lack of safe containment, transportation and treatment or disposal***

also become significant factors in the poor sanitation outcomes of the state. The figure below is a sludge flow diagram (SFD). While it is obvious that at 30.65 percent, open defecation in statutory urban areas is very high, treatment facilities for waste water and septage, even from sanitary latrines, is negligible. The practice of constructing septic tanks and connecting it to open drains is rampant and most of the septic tanks are reportedly poorly constructed. Sludge disposal systems, largely consists of disposal directly into open drains or use of cesspools services on payment provided by the municipalities or private service providers, both of which are in short supply.

SANITATION VALUE CHAIN



Of more concern is the method of sludge disposal, which is generally dumped into an unsecured pit in a designated open area. With the growing number of toilets now being constructed and a lack of available urban land, sludge disposal is a major issue of concern. The state is concerned that it is constructing facilities and infrastructure without paying much paying attention to appropriate low cost technologies. Two sewage treatment plants (STPs) are going to be operational in Ranchi (capacity 37.2 mld) and Adityapur (36 mld) and Rajmahal (3.5 mld). Other STPs are currently under construction in consideration in Sahebganj. The number of treatment plants is currently inadequate given the spread of urbanization across the state, and the number of statutory towns 43 in the state, therefore the septage management is being provided for the smaller cities and towns.

1.5 A clear policy for FSM / Septage management in addition to conventional underground sewerage systems is needed for small and medium towns

Data from Census 2011 on types of latrines by city size, indicates that **as city sizes decreases, the dependence on on-site sanitation and open defecation increases.** This underlines the importance of going beyond traditional sewerage solutions and moving towards faecal sludge management (FSM) / septage management. The policy, however must place this action within a wider policy of septage management across urban areas of Jharkhand particularly for smaller towns.

Keeping the above in mind Government of Jharkhand came out the Faecal Waste and Septage Management Policy to address the issue of sanitation.

1.6 As urban growth in Jharkhand increases, Municipal Solid Waste Management (MSWM) must form part of the core policy for sanitation in the state

Until very recently, the collection of Municipal Solid Waste (MSW) from market places and community bins, street sweeping, bush cutting and drain cleaning, transportation and disposal at the dump yard had been carried out by most ULBs on their own. However, beginning with the Ranchi Municipal Corporation (RMC) and now being replicated in many other towns of the State for about last one years), door-to-door collection of waste is being carried out by engaging private operators and RMC sanitation workers. It has been a gradual transition from a fully ULB-operated model to a Public-Private- Community-Participation (PPCP) model. However, scientific disposal of waste is yet to occur and the waste is dumped at the dump yard without processing or treatment; the dump yard is not scientifically designed. This has led to environmental degradation and air pollution, ground water table pollution and poses grave health hazards.

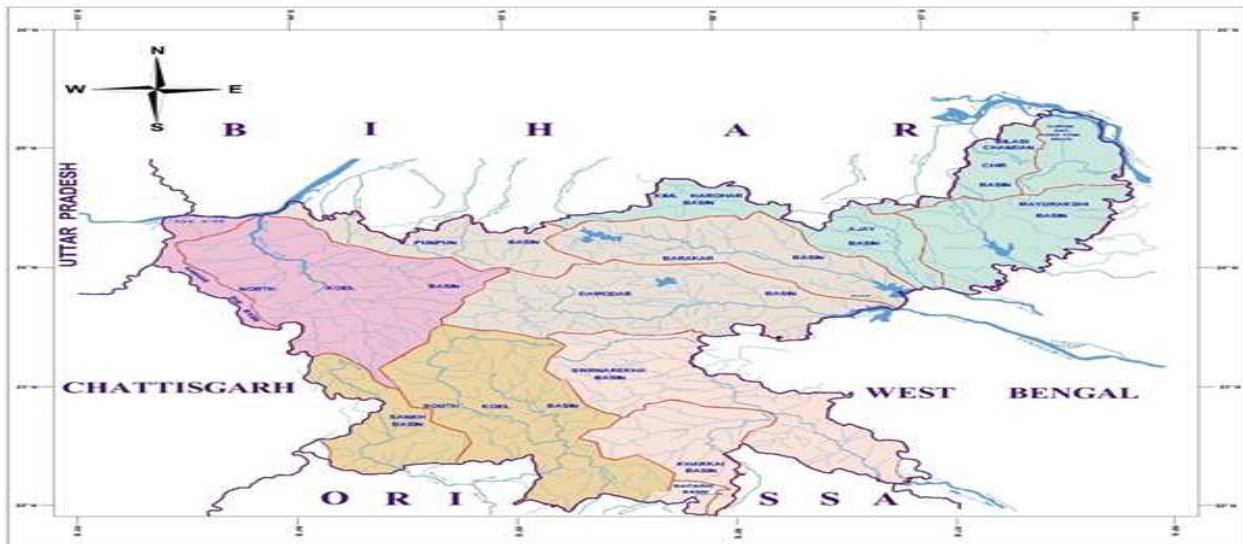
The MSW Rules 2016 designates the ULBs as solely responsible for managing solid waste in their area and states that “within the territorial area of the municipality, [ULBs are] responsible for the implementation of the provisions of these rules, and for any infrastructure development for collection, storage, segregation, transportation, processing and disposal of municipal solid wastes”. However, the ULBs in Jharkhand are yet to fully comply with MSW Rules 2000, and their 2016 successor.

1.7 Site Authorization for SWM Projects

The State Government has initiated various steps for implementation of integrated Solid Waste Management projects in various ULBs as per SWM Rules 2016. As a first step towards it, land was allotted to ULBs to gradually implement the SWM projects involving processing of bio-degradable waste and scientific disposal of processed and inert non-recyclable waste. Most ULBs have secured the site with a compound wall. However, processing facility has not been set up in any of the ULBs. At present, 100% of the sanitation budget is utilized for collection and transportation. Many of the ULBs are in the process of obtaining site authorization from Pollution Control Board for setting up processing plant and construction of sanitary land fill. At present, waste is directly dumped in these sites without processing.

1.8 The river basin pollution abatement policy

Map below shows the river basins in Jharkhand. A sizeable percent of urban areas in Jharkhand directly affect rivers in the state with the open discharge of raw sewage into the rivers through the drains. Therefore, the sanitation policy to also takes into consideration the river basins passing through the cities and towns.



List of major rivers flowing in the state is:

1. Damodar
2. Baitarani
3. Ganga
4. Barakar
5. Ajay N
6. Son River
7. Southkoel
8. Subarnarekha

1.9 The governance of urban sanitation must be aligned to outcomes and should be supported by capacity building of institutions

The primary institution for governance of each urban area is the Urban Local Bodies (ULBs) in Jharkhand which comprise Municipal Corporations, Municipalities, and Notified Area Councils (NACs). Statutory towns (STs) with a population greater than 150,000 are deemed as large urban areas and are administered by Municipal Corporations. Statutory towns with population between 1,50,000 to 40,000 are called municipal council and towns having population 40,000 to 12,000 as Nagar Panchayat.

The Municipalities and the NACs are governed by the Municipal Act, 2011. Besides the local bodies, there are other state department sub-divisions which are responsible for the water and sanitation in all cities. The Water Resource Department is responsible for allotment of water to different sectors like drinking water, irrigation, hydropower, industry, etc., flood control and drainage, and maintenance of water quality. The Drinking Water and Sanitation Department (DWSD), are responsible for water supply and sewerage services in all ULBs. The Jharkhand Pollution Control Board (JPCB) is responsible to ensure standards and guidelines produced under the CPCB are followed in the state. The Directorates of Town Planning are responsible for the preparation of Master plans, monitoring of programs, provision of technical assistance, and regulation of the work of development authorities. The Directorate of Municipal Administration (DMA) regulates the functioning of ULBs and monitors their development functions. In addition to these, the Jharkhand Urban Infrastructure Development Organisation (JUIDCO) provides support in policy formulation, project development activities, and funding of WATSAN projects.

1.10 Capacities of ULBs in Jharkhand to manage an expanding need for sanitation and FSM

The capacity constraints of ULBs include a lack of clarity in roles and responsibilities of various stakeholders and institutions, the overarching responsibilities and functions, and the mixed system of personnel deployment followed in the state; the shortage of skilled staff for adequate coverage as well as enforcement; and both technical and financial shortfalls that do not allow for corrective infrastructural or management interventions. The problems of management are compounded by the need for ULBs to coordinate with multiple agencies.

There is a shortfall of engineers and other staff in the ULBs. However, a system of Municipal Cadres has been recently approved by the state cabinet, although it is yet to be operationalized. ULBs will be grouped into categories depending on the size of the population and human resources will be allocated to each ULB on the basis of those categories. In addition to the cadres, the frontline sanitation workers also need to be sourced, organized and trained to deliver faecal sludge / septage management services at the city level base on the policy made.

There are also issues related to a lack of adequate data for better planning and management, across the sanitation cycle; to ensuring access to the un-served urban poor and the floating population; to the lack of awareness amongst communities, service providers and city managers on the consequence of poor sanitation; to the need for enhanced community participation and above all buildings. Adequate capacities of all stakeholders, especially the ULBs; and to the need for an integrated city-wide approach and adequate and sustained investments for both asset and facility creation as well as O&M. ULBs are especially constrained by 'inadequate personal and systemic capacities' for social mobilization and implementing user-participatory programs. Finally, the ULBs' almost complete dependence on government grants and schemes prevents them from developing their own capacities for planning and management as the funds do not make adequate provisions for sustained capacity building of this kind.

Currently capacity building is limited to departmental trainings on various thematic and functional issues through the State Urban Development Agency and its training partners, which also includes water and sanitation interventions. The capacity building interventions are limited to structured trainings and exposure visits within the framework of programs like AMRUT, Smart City, Swachh Bharat mission (SBM), National Urban Livelihood Mission (NULM), Pradhan Mantri Awas Yojana (Urban) (PMAY-U) and Namami Gange are standardized on the lines of the guidelines provided by Government of India.

CHAPTER 2

VISION, GOALS & PRINCIPLES OF THE POLICY

2.1 Vision

To make towns and cities in Jharkhand totally clean, sanitized, healthy (safe), pollution free, having zero waste, good quality of life and ensuring good public health and healthy environment to all its citizens in line with the National Urban Sanitation Policy.

2.2 Goals

To ensure towns and cities in Jharkhand become totally clean, sanitized, healthy (safe), pollution free, having zero waste, having good quality of life and ensuring good public health and healthy environment to all its citizens.

2.3 Principles of the policy

The policy will be based on the following principles:

1. **Sanitation will be treated as a basic service:** The state government shall create basic infrastructure and opportunities and provide necessary support through which, all citizens can have access to sanitation services as their basic entitlement.

Equity and safety of access and use, particularly to the vulnerable and un-served populations: The state shall endeavor to ensure that no urban citizen, irrespective of socio-economic status, caste, gender, age, or legal status of land/status of migration is denied access to and the use of sanitation services in Jharkhand's cities. In the case of residents with no tenure security, the state will make effort to resolve tenure issues in providing individual household sanitation facilities or community sanitation facilities. However, where sanitation services are provided in areas without tenure security, the provision of these services will not entitle the individual/household any legal right to the land. In addition to this, the state and ULBs will ensure that access to such facilities (especially community and public) are maintained with an adequate level of cleanliness, and safety of access, especially for women. Adequate arrangements for access for the differently abled will also be made at these facilities (new / upgraded facilities).

2. **Increased awareness and ensuring better participation of the citizens for achieving the collective goal of sanitized cities/towns, recycle and reuse of waste water and scientifically managed municipal solid waste:** The causal linkages of sanitation and solid waste with public and environmental health need to be made more explicit to citizens, communities and institutions. In addition to the provision of facilities, sustained improvements in the quality of life are possible when supplemented by hygiene and behavior change. The state will aim to generate demand for safe sanitation, and

scientifically managed solid waste especially among the un-served households. Citizens, communities, institutions, and cities as a whole will be encouraged to play an active role in both behaviour change towards safe sanitation and ensuring the adoption and use of safe technology to protect the environment. To achieve the goal the government will make all efforts to increase the participation of the citizens for better sanitation facilities.

Institutional roles, responsibilities and capacity development: The policy will hinge on progressive articulation in policy and law followed-up by operations that are in line with the spirit of the 74th Constitutional Amendment Act, 1992. Devolution of functions, funds and functionaries will need to be progressively ensured to the ULB with adequate support for building planning, and management capacities. The quality of city sanitation planning will depend upon the vibrancy of sub-city representative institutions that draw on civil society to ensure active citizen engagement.

3. **Emphasis on operations and maintenance of sanitation and solid waste management infrastructure:** One of the key reasons for poor sanitation infrastructure as well as high capital expenditure on sanitation is the lack of operations and maintenance of existing sanitation infrastructure. ULBs will be responsible to ensure that existing sanitation infrastructure is maintained at adequate operational levels, either through official funds, or in partnership with the private sector. The applicable user charges to be collected from the people using the services for collection, transportation and collection. Penalty to be imposed in the cities and towns where households, establishment, institutions etc. don't adhere to the norms.

Integrating broader environmental concerns in the provision of urban sanitation and solid waste management service delivery: The environment (land, air, and water resources) must be considered in all development activities for sanitation provision and management. All planning and implementation will seek to ensure that adverse risks to public health and the environment are adequately minimized at all stages in the sanitation chain and solid waste management. In sanitation the containment, collection, transportation or conveyance, treatment and re-use or disposal of septage/sewerage and waste water will be worked on and in solid waste management the entire chain of collection, transportation, processing and disposal will scientifically managed. Appropriate protection of the environment shall be applied, including prosecution under the laws required. The state government will prioritize those cities that directly or indirectly affect rivers or river basins in the state due to discharge of untreated domestic wastewater for setting up pollution abatement systems. The policy on waste water management & faecal sludge & septage management policy will be put to use.

4. **Choosing technology and solutions appropriate to the context:** Under the policy, the choice of technology and solutions will be contingent upon the needs of that context. For example, if, in the course of evaluation, decentralized and on-site technologies and solutions are context appropriate, then those should be chosen as opposed to blindly applying the choice of networked sewerage systems.

CHAPTER 3

3.1 OUTCOMES

Under the policy, over the next 10 years, the policy will concentrate on achieving the following 10 outcomes:

1. Urban areas are Open-defecation free (ODF) and open discharge free(ODF+/++)
2. Solid waste is safely managed, processed & scientifically treated
3. Use the principal of 5 R, reduce, reuse, recycle, refurbish and recover in waste management
4. Sewage, septage / faecal sludge and liquid waste is safely managed, treated, recycled and disposed
5. Safety standards and guidelines are followed in the physical handling and management of waste
6. Women and girls have access to safe menstrual hygiene management
7. Cities/towns do not discharge untreated waste (water and faecal waste) into the water bodies of Jharkhand.
8. Efficient processing and scientific management of solid waste in the city
9. Scientific handling, processing and management of Hazardous waste, Bio-medical/ hospital waste, plastic waste and e-waste.
10. Proper handling, processing and use of construction and demolition waste.

SECTION 1 - SANITATION

3.2 Outcomes of the policy

3.2.1 Urban areas are open-defecation free and discharge free

This shall be a key outcome of the sanitation policy. In addition to infrastructure provision, this outcome requires behavior change at the individual, household, community, institutional and city levels. It is therefore the most crucial and challenging to achieve.

Open defecation free under this policy is understood as the termination of faecal- oral transmission determined by:

- A. No observed open defecation;
- B. All city residents have access to and use of household, community, and/or public latrines;
- C. There is adequate access and use of latrines in all institutions, offices, academic institutes, religious bodies etc;
- D. All insanitary latrines (including single pit latrines) are converted to sanitary latrines, and no incidence of Manual Scavenging observed
- E. All city residents are engaged in safe hygiene practices, including hand washing;
- F. All the latrines have access to piped water

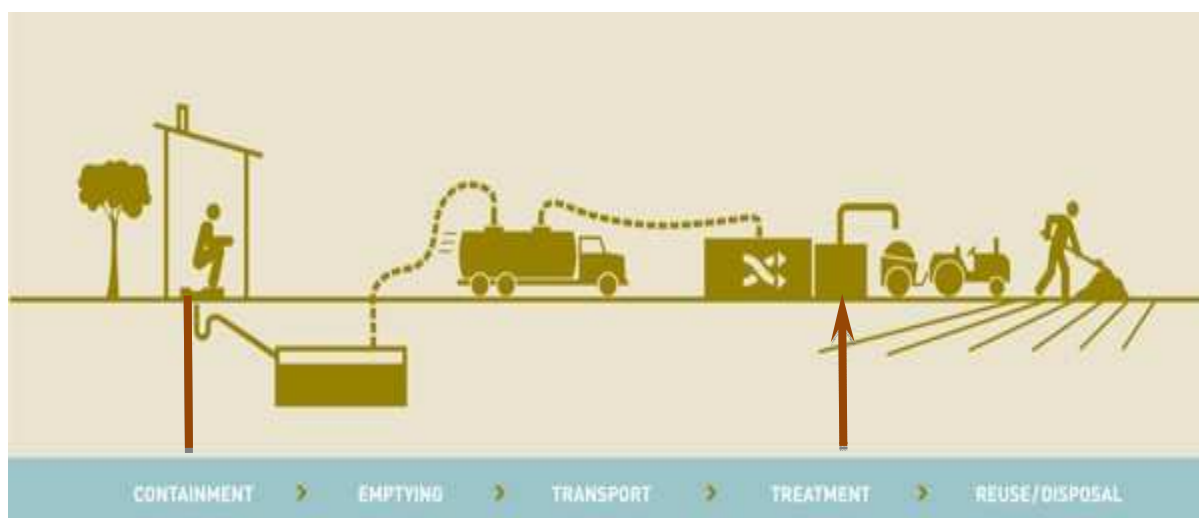
In addition, open discharge free, under this policy shall be understood to mean an environment free from human waste which shall be determined as follows:

- G. There is no open discharge of faecal and liquid waste, or raw sewage into the open drains or environment
- H. There is safe containment, collection, transportation, treatment, recycle and disposal of sewage, septage, and waste water.

3.2.2 Fecal Sludge and Septage Management

This outcome shall aim to ensure that wherever faecal waste is generated in the urban environment, it is safely confined, regularly collected, safely transported, and disposed after adequate treatment; with due care being taken of persons, machinery, materials and surroundings involved in the process. In Jharkhand, where the majority of households and institutions have access to on-site sanitation, the focus in the coming years of the policy will be on septage/faecal sludge management (FSM).

Under this outcome, the entire sanitation chain will be covered as per the state policy.



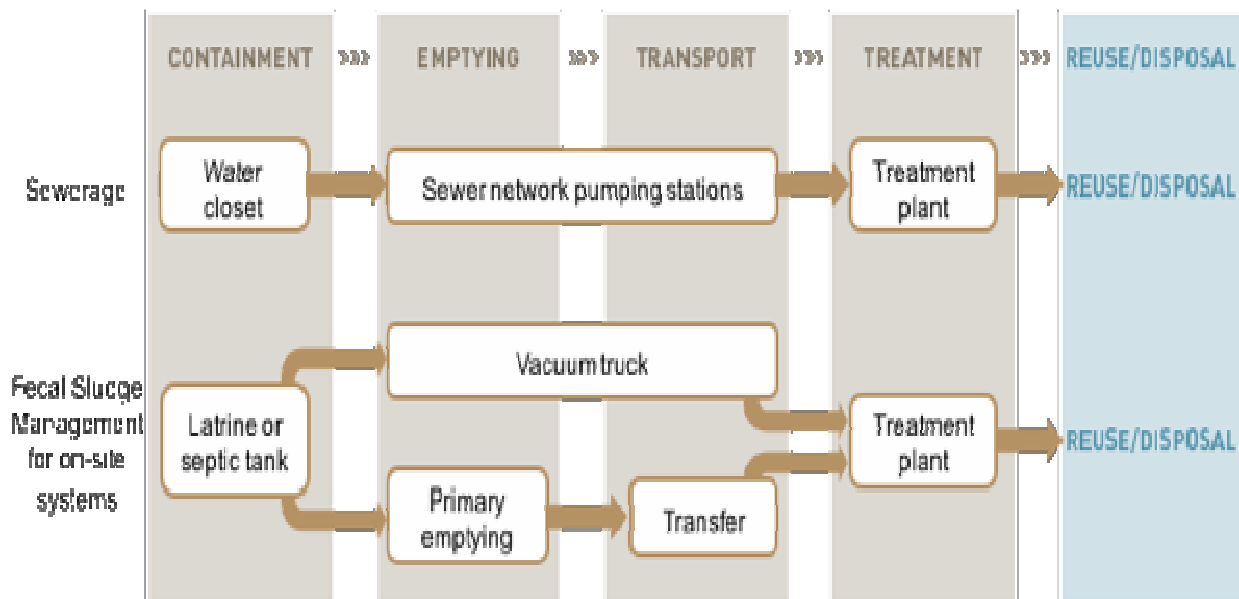
Here toilet construction technologies will ensure safe containment of human faeces from the environment

Regular de-sludging of septic tanks and other on-site systems will be undertaken in a safe and scientific manner

The transportation of this sludge to the treatment site shall be undertaken to approved treatment sites designated by ULBs

Only approved and designated treatment facilities by ULBs shall be used. This may be either at an existing Sewage Treatment Plant (STP) designated for treatment of sewage and sludge, or at an independent faecal sludge treatment plant (FSTP)

This involves treatment of solid sludge for reuse by composting, with the final effluent discharged into surface water, or re-used for gardening or agricultural purposes after due processing



The state government will cover the entire sanitation chain

The key objective of the FSSM Policy is to set the context, priorities, and direction for, and to facilitate, state-wide implementation of FSSM services in all ULBs such that safe and sustainable sanitation becomes a reality for all in each and every household, street, town and city. More specifically, the Policy will:

- i. Mainstream FSSM by the year 2019, and ensure that all benefits of wide access to safe sanitation accrue to all citizens across the sanitation value chain from containment, extraction, transportation, treatment, and disposal / re-use of all Faecal sludge, septage and other liquid waste and their by-products and end-products.
- ii. Suggest and identify ways and means, including the methods and resources, towards creation of an enabling environment for realising safe and sustainable FSSM in Jharkhand
- iii. Define the roles and responsibilities of various government entities and agencies, and of other key stakeholders such as the private sector, civil society organisations and citizens for effective implementation of FSSM services.
- iv. Enable and support synergies among relevant Central and State Government programs such as SBM, AMRUT, Smart Cities Mission, NULM, PMAY-U and Namami Gange to realise safe and sustainable sanitation for all at the earliest, possibly by the year 2019.
- v. Adopt an appropriate, affordable and incremental approach towards achieving laid out environmental standards for FSSM.

Unless otherwise specified, the scope of this Policy extends to all the projects, programs and schemes of the Jharkhand Government that facilitate and support sanitation services, urban development and improved delivery of services in urban and peri-urban areas and any other approved program or scheme by the private sector. It also covers the initiatives undertaken and/or supported by all the Ministries, Departments, Agencies, Authorities and Public Sector Undertakings in the State that have a bearing on sanitation services in urban and peri-urban areas. Further, the Policy applies to every urban local body, outgrowths in urban agglomerations, census towns as declared by the Registrar General and Census Commissioner of India, notified areas, notified industrial townships, areas under the control of Indian Railways, airports, airbases, Ports and harbours, defence establishments, special economic zones, State and Central

government organisations within the State, places of pilgrims, religious and historical importance as may be notified by the State government from time to time.

3.3 Policy implementation roles and responsibilities

Responsibility for Establishing Basic Regulatory Requirements for Faecal Sludge Management rests with ULBs. SUDA will maintain an oversight role and will Integrate and interpret the requirements of the several applicable Federal laws and issue regulations and guidance to ensure that they are applied consistently toward municipal sludge management;

Establish regulatory requirements that promote beneficial sludge use:

1. Provide standards that establish contaminant levels and management practices for acceptable municipal sludge use and disposal:
2. Establish minimum requirements for Jharkhand State sludge management programs providing sufficient discretionary authority for States to tailor their programs and actions to local variation:
3. Enforce adherence to Federal requirements where not enforced by ULBs:
4. Provide guidance and information on sludge treatment technologies and practices and direct technical assistance to States and local governments:
5. Support research and development, and encourage the demonstration of projects to facilitate the advancement and use of new or improved technologies. Responsibility for Ensuring Effective Sludge Management by ULBs rests primarily with JUIDCO.
6. JUIDCO shall establish and maintain regulatory and oversight program adequate to implement State and Federal requirements;
7. JUIDCO to provide active assistance to local ULBs in planning their sludge management.

Responsibility to Operate and Maintain Appropriate Sludge Management Systems Rests with Each Municipality.

- i. Municipalities are responsible for operating and maintaining sludge management systems which comply with applicable Federal and State regulatory requirements.
- ii. Municipalities are responsible for maintaining sludge use and disposal capacity sufficient to meet the needs of their wastewater treatment systems.
- iii. Municipalities are responsible for controlling the discharge of contaminants into their sewerage systems so that sludge quality is suitable for meeting regulatory requirements and local management

The policy specifically endorses the following core principles:

- i. To protect public health
- ii. To protect the environment and the State's water resources
- iii. To promote proper functioning of network-based sewerage systems along with the septic system and ensure connections of household.

- iv. Treatment of sewage and sludge is required prior to discharge into the environment
- v. Promoting recycle & reuse of treated sewage/septage for nonportable applications.
- vi. To make Sewerage/septage project economical and environmentally sustainable.
- vii. Inclusive and participatory decision making.
- viii. Transparent decision making processes to achieve socio-environmental as well as economic financial objectives
- ix. Capacity building for enhanced institutional ability to govern the sector effectively.
- x. Ensuring, protecting and optimizing investments.
- xi. Public Private Partnership (PPP) in the most appropriate manner.
- xii. Public outreach for environmental and health related outcomes.
- xiii. Establishment of an efficient, effective, affordable and accountable system for managing urban sewerage and septage management

3.4 Safety standards and guidelines are followed in the physical handling and management of liquid waste

The Prohibition of Employment as Manual Scavengers and their Rehabilitation Act was passed by the Union Government on 19th September 2013 (MSA 2013). While the list of definitions is exhaustive under the MSA 2013, the following definitions are important for the current Policy and have been reproduced below for ready reference:

- ***“manual scavenger”*** means a person engaged or employed, at the commencement of this Act or at any time thereafter, by an individual or a local authority or an agency or a contractor, for manually cleaning, carrying, disposing of, or otherwise handling in any manner, human excreta in an insanitary latrine or in an open drain or pit into which the human excreta from the insanitary latrines is disposed of, or on a railway track or in such other spaces or premises, as the Central Government or a State Government may notify, before the excreta fully decomposes in such manner as may be prescribed, and the expression “manual scavenging” shall be construed accordingly
- ***“hazardous cleaning”*** means cleaning by an employee, in relation to a sewer or septic tank, means its manual cleaning by such employee without the employer fulfilling his obligations to provide protective gear and other cleaning devices and ensuring observance of safety precautions, as may be prescribed or provided in any other law, for the time being in force or rules made there under
- ***“insanitary latrine”*** means a latrine which requires human excreta to be cleaned or otherwise handled manually, either in situ, or in an open drain or pit into which the excreta are discharged or flushed out, before the excreta fully decomposes in such manner as may be prescribed. Provided that a water flush latrine in a railway passenger coach, when cleaned by an employee with the help of such devices and using such protective gear, as the Central Government may notify in this behalf, shall not be deemed to be an insanitary latrine.

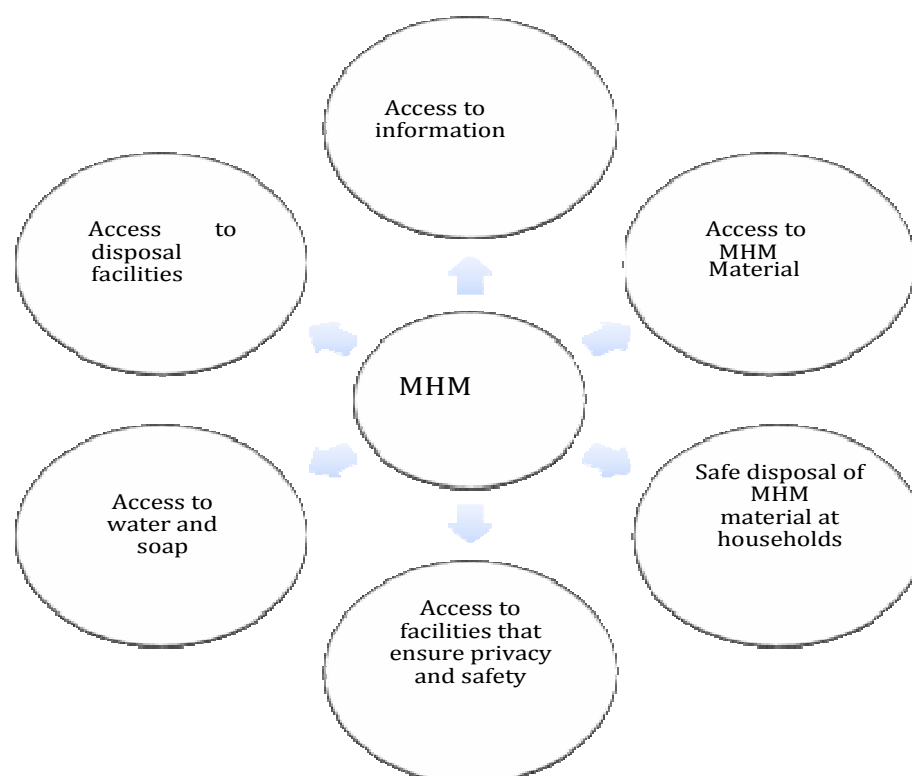
3.5 Women and girls have access to safe menstrual hygiene management(MHM)

In 2012, the Joint Monitoring Programme (JMP) of the WHO and UNICEF defined Menstrual Hygiene Management as follows: “Women and adolescent girls are using a ***clean menstrual management material*** to absorb or collect menstrual blood, that can be ***changed in privacy as often as necessary*** for the duration of a menstrual period, ***using soap and water for washing*** the body as required, and having ***access to safe and convenient facilities to dispose*** of used menstrual management materials. They ***understand the basic facts*** linked to the menstrual cycle and ***how to manage it with dignity and without discomfort or fear***”.

The key challenges faced by women and girls during their periods of menstruation include:

1. A lack of sanitary protection materials leading to embarrassment and stress due to leakage and malodour.
2. A lack of menstrual hygiene-friendly facilities in the home, workplace, and common/community areas, which results in a number of women being unable to change materials in dignity and safety. This results in absence from work and schools.
3. A fear of using the latrine due to staining, the lack of privacy, inadequate disposal facilities, or unsafe location of latrine facilities.

The state government shall promote the access of women and girls to safe Menstrual Hygiene Management in public, community, and private institutional sanitation facilities as follows:



The strategy document will outline the activities that the state government undertakes to ensure that safe and effective MHM is available to all who need it.

3.6 Cities/towns do not discharge untreated waste (solid, liquid, and faecal waste) into the water bodies of Jharkhand

The aim of this outcome is the elimination of urban pollutants – septage / faecal sludge, and municipal solid waste – into the rivers and river basins of Jharkhand from urban and peri-urban areas thus ensuring the protection, conservation restoration, regeneration and integrated development of river sand river basins in Jharkhand.

At present, cities are disposing septage/sludge directly into water bodies, either through non-functional drains, natural drains, or through open defecation. This is compounded by solid waste being disposed into rivers/river basins. Under this outcome, Jharkhand will focus on a combination of strengthening the constructed drainage systems, strong FSM/septage management, and/or underground sewerage networks where relevant (including treatment plants), and interception, diversion, and treatment of septage and waste water flowing through natural drains

3.7 Waste Water Recycling and Reuse

On Resource Development

Wastewater is a perennial water source and shall form an integral part of renewable water resources and the State water budget. All local bodies will make city wastewater reuse plan (CWP) for a period of 20 years considering future development and city development in line with city Master plan to avoid any conflicts in developing the city in the future.

Treatment of wastewater shall be targeted towards producing an effluent fit for reuse in irrigation or horticulture in accordance with World Health Organisation (WHO) guidelines as a minimum. Reuse of treated wastewater in other purposes shall be subject to appropriate specifications. Coordination shall be maintained with the official bodies in charge of urban development to account for the treatment and disposal of their liquid wastes. Central treatment plants shall be built to serve semi-urban areas, and collection of wastewater can be made initially through trucking until collection systems are justified. Specifications and minimum standards as stipulated by Central Public Health and Engineering Department (CPHEEO) shall be applicable for the use of septic tanks in urban areas. Particular attention shall be paid to the protection of underlying aquifers.

On Resource Management

It is highly imperative that Urban Local Body shall develop and manage wastewater systems as well as the treatment and reuse of the effluent.

A basin management approach shall be adopted where possible. The use of treated wastewater from sewerage, households, commercial and from industrial application shall be given the highest priority and shall be pursued with care. Effluent quality standards shall be defined based on the best attainable treatment technologies, and calibrated to support or improve ambient receiving conditions, and to meet public health standards for end users. Key factors will include the location of the discharge, its proximity to wells, the type of receiving water, and the nature and extent of end uses. Industries shall be encouraged to recycle part of its wastewater and to treat the remainder to meet standards set for ultimate wastewater reuse or to meet the regulations set for its disposal through the collection systems and/or into the receiving environment. Wastewater from industries with significant pollution should be treated separately to standards allowing its reuse for purposes identified by the city or to allow its safe disposal or water recharging. Consideration shall be given to isolating treated

wastewater from surface and ground waters used for drinking purposes, and to the blending of treated effluent with relatively fresher water for suitable reuse. Urban Local Bodies can engage Experts from Government Engineering Colleges of Jharkhand NITs/Engineering colleges.

On Wastewater Collection and Treatment

City Plan A proper and updated city plan is an essential pre-requisite for proper planning and design of all utilities and more so for the Sewerage Systems and water recycled from houses. The State shall endeavor to have proper digital city maps showing the levels prepared through modern available technology. The digital city maps should clearly show the city feature over ground and underground including all utilities. Geographical Information System (GIS), Ground Penetrating Radar (GPR), Total station etc. tools may be used for preparation of city map. The city maps should be updated for every 5 years. An effective and comprehensive GIS based data base and Management Information System correctly mapping the assets, user base and status of operations shall be established.

Design Period: Every city has to prepare a City Wastewater Recycling Plan (CWP) for next 20 years along with 5 year short term plan. The CWP for the city should take into account the likely changes in the city in next 20 years and plan for them and will be according to city Master plan. The Detailed Project Report (DPR) for recycling should be in accordance to CWP. The design of the sewers and planning of space should be for the 30 year projection requirements and for recycling from households and commercial establishments. However, the units which can be developed in modules (e.g. Sewage Treatment Facility, sewerage Pumping machinery, onsite treatment facilities, etc.) can be designed for appropriate shorter period. Earmark of land for Sewage Pumping Station (SPS) and Sewage Treatment Plant (STP) should be done for all Urban Local Bodies (ULBs) and appropriate land allotment shall be done by Development Authority/Urban Improvement Trust/State Govt. on priority.

On Reuse of Treated Effluent and Sludge

- i. Treated wastewater effluent is considered a water resource and is added to the water stock for reuse.
- ii. Blending of treated wastewater with fresh water shall be made to improve quality where possible.
- iii. Crop nutrient requirements shall be determined taking into consideration the prevailing effluent quality. Overuse of nutrients shall be avoided.
- iv. Accumulation of heavy metals and salinity shall be monitored, managed and mitigated. Leaching of soils shall be advocated by the irrigation authorities.
- v. Treated effluent quality should be monitored and users alerted to any emergency causing deterioration of the quality so that they will not use such water unless corrective measures are taken.
- vi. Studies should be conducted and projects designed and implemented to store the excess treated wastewater in surface reservoirs but artificial recharge is not permitted. Due attention shall be given to the quality of treated and groundwater and the characteristics of the strata.

Industry: Industrial reuse of reclaimed wastewater represents major reuse next only to irrigation in both developed and developing countries. Reclaimed wastewater is ideal for many industrial purposes. Where effluent is to be used in the industrial processes, it should be the responsibility of the industry to treat it to the quality standards required. Waste water to achieve adequate quality for reuse as cooling water.

The membrane filtration system can remove all suspended solids, fecal coliforms, and giardia cysts. It could also significantly reduce human enteric viruses such as *reovirus* and *enterovirus*.

Industrial uses for reclaimed water include: (i) Evaporative cooling water: (a) once-Through cooling system (b) Re-circulating cooling system (C) cooling water quality requirements (ii) Boiler –Feed water- The use of reclaimed water differs little from use of conventional public supplies for boiler-feed water, as both require extensive additional treatment quality requirement for boiler feed make up water are dependent upon pressure at which boiler is operated (iii) Industrial process water- Suitability of reclaimed water for use in industrial process depends upon particular use like- (a) Pulp and paper (b) chemical industry. (c) Textile industry (d) Petroleum and coal

Re-use Options: The following options or re-use of effluent have been identified: In general, public health concern is the major issue in any type of reuse of wastewater, be it for irrigation or non-irrigation utilization, especially long-term impact of reuse practices. It is difficult to delineate acceptable health risks and is a matter that is still hotly debated. Potential reuse of wastewater depends on the hydraulic and biochemical characteristics of wastewater, which determine the methods and degree of treatment required. While agricultural irrigation reuses, in general, require lower quality levels of treatment, domestic reuse options (direct or indirect potable and non-potable) reuses need the highest treatment level. Level of treatment for other reuse options lie between these two extremes. The reuse options may be (artificial recharge of aquifers is not permitted):

- i. Irrigation (a) Agriculture, horticulture and forestry (b) Landscaping
- ii. Fish – farming
- iii. Industry
- iv. Non-potable Domestic Reuse:

The detailed project report should clearly define the best reuse option particular to town and strategy to obtain it. Action plan with clarity should be the part of Detailed Project Report (DPR), while preparing sewerage Projects. Before deciding the reuse of treated waste water authority must full fill the water quality norms and its legal implications.

Governing local body can sell the treated waste water and digested sludge to generate the revenue.

CHAPTER 4

SECTION II – MUNICIPAL SOLID WASTE MANAGEMENT

4.0 Municipal Solid Waste is safely managed and treated

Between March and April 2016, the Ministry of Environment, Forest and Climate Change, Government of India notified the following rules:

- i. Solid Waste Management Rules, 2016;
- ii. E- Waste (Management) Rules, 2016;
- iii. Plastic Waste Management Rules, 2016;
- iv. Construction and Demolition Waste Management Rules, 2016;
- v. Bio-Medical Waste Management Rules, 2016; and
- vi. Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016 and
- vii. Batteries (Management and Handling) Rules 2001

4.1 Solid Waste

According to the SWM Rules 2016, solid waste includes solid or semi-solid domestic waste, sanitary waste, commercial waste, institutional waste, catering and market waste, and other non- residential waste, street sweeping, silt removed or collected from surface drains, horticultural waste, agriculture and dairy waste, treated bio-medical waste. This excludes industrial hazardous waste, untreated bio-medical waste and e-waste, battery waste, and radio-active waste. Municipal Solid Waste Management (MSWM) refers to a systematic process that comprises of waste segregation and storage at source, primary collection, secondary storage, transportation, resource recovery, processing, treatment, and final disposal of solid waste.

4.2 Approaches for Solid Waste Management

4.1.1 Decentralized and Centralized approach

4.1.2 Management of Multiple Solid Waste streams

4.1.3 Hierarchy of Waste Management – 5 Rs (Reduce - waste generator, Reuse – waste generator/ companies/ government, Recycle/ Refurbish - waste generator/ NGOs/ companies, Recover - company and Remove – NGO/ company/ government).

4.1.4 Strategy and Service outcomes:

The overall strategy is to ensure 100% compliance to the SWM Rules 2016 and related legislations and judgment of NGT w.r.t to municipal solid waste in all the cities and towns through multi stakeholder partnership approach.

- ❖ The specific strategy are: 100% Door to Door collection and Source Segregation
- ❖ Efficient collection and safe and segregated transportation of wastes generated in the cities 100%
- ❖ treatment and scientific disposal facility & cost recovery
- ❖ Better awareness among the urban population and community mobilization participation
- ❖ Capacity Enhancement and Optimization of the human resources in SWM
- ❖ Strengthen the existing bye-laws for better regulation and user charges
- ❖ Encourage PPP in developing integrated treatment and disposal in scientific & safe manner.

4.3 Key Issues of Solid Waste Management:

- ULBs lack resources, systems and capacity for development of treatment and disposal of solid waste.
- Lack of substantial capital and O&M expenses without corresponding and matching revenues
- Lack of support in financial, technical and project development at state level to ULBs in identifying right technologies, processes, structuring projects and implementation. The role of the technical and advisory agencies.
- Lack of awareness about the importance of good SWM practices especially about waste segregation
- Lack of policy framework in operationalizing PPP in MSWM and contract competence Not in my backyard (NIMBY) phenomenon, land acquisition is major issue in SWM projects and is a major cause of delay; especially in processing & landfill facilities
- Lack of technical expertise and institutional arrangements Inadequate equipment and inappropriate technology choices
- Lack of willingness to charge user fees provisions in Municipal Acts for levy of user charges
- Lack of Capacity in ULBs with reference to the processing technologies and scientific landfills even after a decade.
- Involving rag pickers and SHG in the waste management.

4.4 Strategic Interventions

The proposed Strategy employs the eleven (11) main elements:

- I. Providing land for the setting up processing plant and Scientific Landfill facility
- II. Segregation of waste at source
- III. Door to Door Collection of Waste generated
- IV. Waste minimization and promotion of recycling of waste
- V. Engaging stakeholders in implementation
- VI. Promotion of in-house composting facilities
- VII. Promotion of reuse of plastic waste
- VIII. Processing, Treatment and Disposal of Waste
- IX. Strengthening the capacities of the ULBs
- X. State Level Institutional arrangements & Program support
- XI. Funding of the SWM projects
- XII. Creation of buffer zone for cities generating more than 5 TPD of waste.

4.5 Future Plan:

State Government is under the process of preparation of an action plan to provide efficient management of Solid Waste Management. As per the guideline laid in the SWM Rule 2016, CPHEEO manual, SBM manual, the directions given by the NGT from time to time and other regulatory bodies. Since the cluster approach is not viable for the all ULBs of the state so maximum are having its own processing and landfill site. Only for 9 ULBs government is having cluster approach.

Considering the facts that the operation and maintenance of the SWM projects require considerable skill and marketing of by products, the Government has decided to

execute these projects on PPP mode on the basis of “ Design, Built, Operate and Transfer” on a concession period of minimum 20 years. .

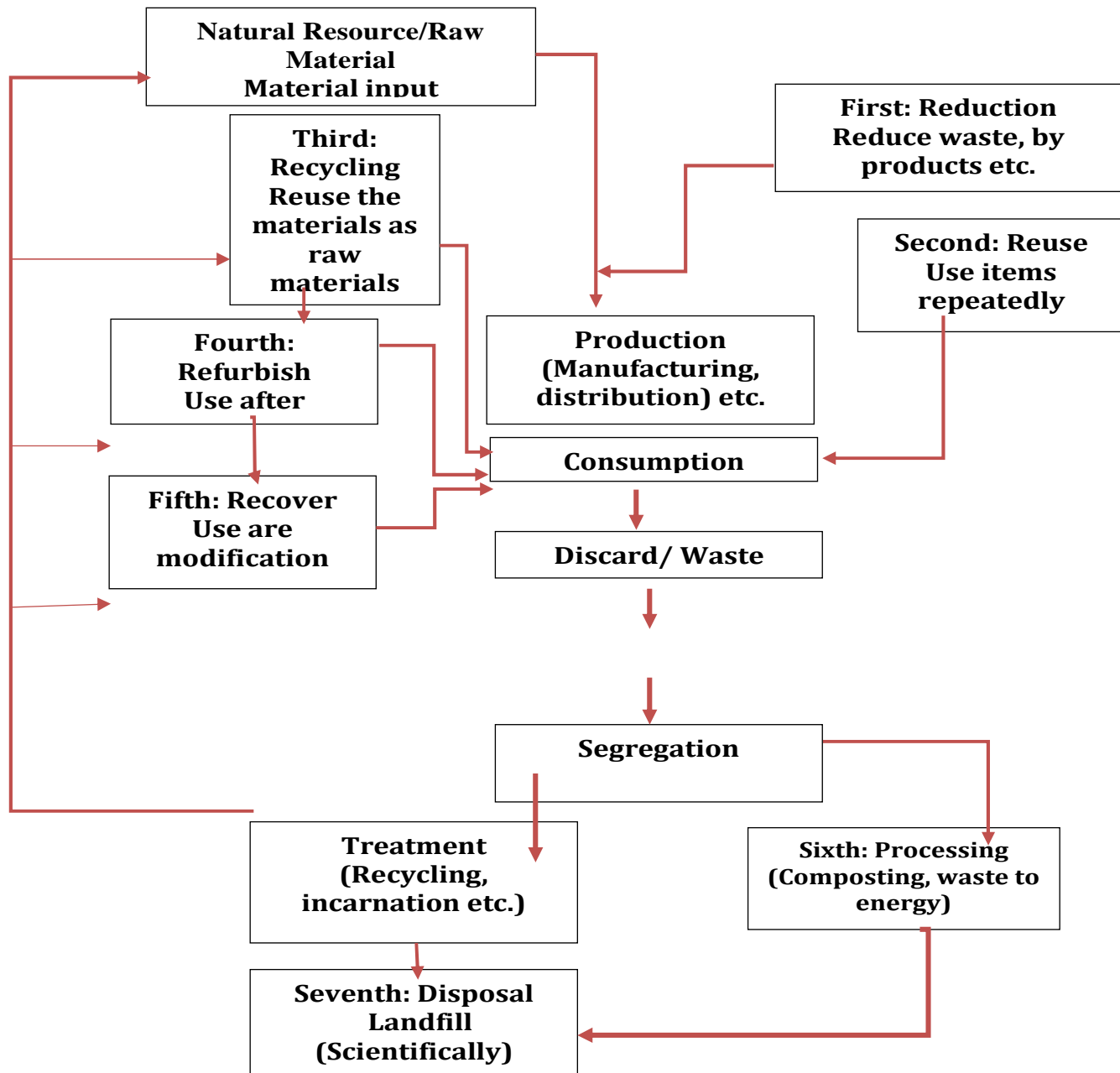
4.6 Technology Approach and Initiatives:

All the treatment strategies for Municipal Solid Waste (MSW) are directed towards reducing the amount of MSW that needs be land filled as well as utilizing the materials present in the waste as a resources to the largest possible extent. Viewing the characteristic and quantity of the waste in the state DPRs has been prepared or being prepare based on Waste to Composting Technology. However viewing the interest of the private parties in the RFP government has decided to keep open technology.

Government of Jharkhand has already taken initiative to attract Waste to Energy plant Operator to bid in the tenders. The Government has already given power purchase rate approval for Ranchi waste to energy plant by State Electricity Regulatory Commission (SERC).

Capacity building of the ULBs officials many workshop and site visit activities has been conducted during the 2016 – 17 and are in the future plan of the coming years. To enhance and success of SWM projects intensive IEC and other awareness programs and activities has been planned to create awareness among the citizens mainly about source segregation, use of dustbins etc. Therefore, with a combination of IEC and enforcement drive like Service Charges for Solid waste collection from door to door (Annexure – I) the level of segregation is expected to increase.

Jharkhand will follow a policy whereby minimal amount of waste is sent to landfills by following the 5 (five) Rs, namely reduce, reuse, refurbish, recycle and recover. The ultimate goal will be to create value out of waste and produce a paradigm shift from garbage as ‘disposable’ to ‘renewable resource’.



Schematic Diagram for Waste Management

The aim of this policy is to ensure cleaner streets and neighborhoods, improved quality of life by reducing health and hazard risks (such as vector-borne diseases like dengue and malaria) associated with garbage piles, and ensure segregation of waste and doorstep collection at affordable rates. In order to effect this, the state will, in the next 10 years aim to drastically improve the efficiency of waste processed, and eventually move to a decentralized system for processing waste. The different categories of waste will be managed efficiently at the ULB level, these are, e-waste, hazardous waste, health care waste, plastic waste and construction and demolition waste.

CHAPTER 5

OTHER TYPES OF WASTE

5.1 E-Waste

Disposal of e-wastes is a particular problem faced in many cities. Computer wastes that are landfilled produces contaminated leachates which eventually pollute the groundwater. The most dangerous form of burning e-waste is the open-air burning of plastics in order to recover copper and other metals. The toxic fall-out from open air burning affects both the local environment and broader global air currents, depositing highly toxic by products in many places throughout the world.

Remedial actions suggested

Several remedial actions has to be carried out so that the e-waste is managed properly in all the urban areas. The major actions is being mentioned below. The important steps to be taken for e-waste are

- i.) Recovery and Reuse**
- ii.) Responsibility of Government/ ULB**
- iii.) Responsibilities and role of Industries**

Recovery and Reuse

Waste can be recovered on-site, or at an off-site recovery facility, or through inter industry exchange. A number of physical and chemical techniques are available to reclaim a waste material such as reverse osmosis, electrolysis, condensation, electrolytic recovery, filtration, centrifugation etc. For example, a printed-circuit board manufacturer can use electrolytic recovery to reclaim metals from copper and tin-lead plating bath.

Responsibilities of the Government/ ULBs

- (i) Department of Industries will be responsible for ensuring that every producer submits to the department Extended Producer Responsibility Plan (EPR-Plan). The plan should contain estimation of e-waste generation.
- (ii) Department of Industries to ensure that the transportation of e-waste is done as par the guidelines mentioned in the e-waste rules 2016.
- (iii) Department of Industries to ensure that the dismantling of e-waste is done in the scientific manner as par the guidelines mentioned in the e-waste rules 2016.
- (iv) Department of Industries to ensure that the recycling of e-waste is done in the scientific manner as per the guidelines mentioned in the e-waste rules 2016.
- (v) Department of Industries will be responsible to ensure earmarking or allocation of industrial space or shed for e-waste dismantling and recycling in the existing and upcoming industrial park, estate industrial cluster.
- (vi) Industries department to set up regulatory department in the office, which will be vested with the responsibility of coordinating and consolidating the regulatory functions of the various government authorities regarding e-waste management at the city level.
- (vii) Industries department will be responsible for providing an adequate system of regulations, controls and administrative procedures for e- waste and hazardous waste management. Existing laws concerning e-waste disposal be reviewed and revamped. A

comprehensive regulations that provides e-waste regulation and management and proper disposal of hazardous wastes will be laid out. Such a law should empower the department in the industries department to control, supervise and regulate the relevant activities of government departments.

Under this policy the concerned department will do the following functions.

- Develop guidelines for the manufacturers, processors and importers to deposit basic information on the e- materials handled by them from and to maintain an inventory of these materials. The information should include toxicity and potential harmful effects.
- Identify potentially harmful substances and ask the manufacturers, processors and importers to test them for adverse health and environmental effects.
- Manufacture, processing units, distributors and other agencies using these kind of product give an action plan for recycling, proper handling and disposal of electronic wastes at the city level.
- Encourage beneficial reuse of "e-waste" and encouraging business activities that use waste". Set up programs so as to promote recycling among citizens and businesses.
- Educate e-waste generators on reuse/recycling options

(viii) Industries department to enforce strict regulations against dumping e-waste in the city. Where the laws are flouted, stringent penalties to be imposed.

- a. Industries department to enforce strict regulations and heavy fines levied on industries, which do not practice waste prevention and recovery in the production facilities.

(ix) Polluter pays principle and extended producer responsibility to be adopted.

(x) Industries department to encourage and support NGOs/ SHGs/Rag Pickers and other organizations to involve themselves actively in recycling, reuse and proper disposal the e-waste problems in the city.

(xi) Uncontrolled dumping is an unsatisfactory method for disposal of e-waste and hazardous waste to be stopped and heavy penalty to be imposed on its violation.

(xii) Industries department to explore opportunities to partner with manufacturers and retailers to provide recycling services.

(xiii) Industries department to stop the collection of the e-waste from the houses, commercial area, industrial area, institutions etc. and the authorised agency have to scientifically dispose the waste on their own

(xiv) Industries department to empanel authorised agencies for collection and disposal of the e-waste.

Responsibility and Role of industries

1. Generators of wastes will take responsibility to determine the output characteristics of wastes and if hazardous, should provide management options.
2. All personnel involved in handling e-waste in industries including those at the policy, management, control and operational levels, should be properly qualified and trained. Companies can adopt their own policies while handling e-wastes. Some are given below:

- Use label materials to assist in recycling (particularly plastics).
- Standardize components for easy disassembly.
- Re-evaluate 'cheap products' use, make product cycle 'cheap' and so that it has no inherent value that would encourage a recycling infrastructure.
- Create computer components and peripherals of biodegradable materials.
- Utilize technology sharing particularly for manufacturing and de manufacturing.
- Encourage / promote / require green procurement for corporate buyers.
- Look at green packaging options.

3. Companies working in the ULBs to adopt waste minimization techniques, which will make a significant reduction in the quantity of e-waste generated and thereby lessening the impact on the environment. It is a "reverse production" system that designs infrastructure to recover and reuse every material contained within e-wastes metals such as lead, copper, aluminum and gold, and various plastics, glass and wire. Such a "closed loop" manufacturing and recovery system offers a win-win situation for everyone, less of the Earth will be mined for raw materials, and groundwater will be protected, researchers explain.

4. Manufacturers, distributors, and retailers will have to undertake the responsibility of recycling/disposal of their own products.

5. Manufacturers and sellers of computer monitors, television sets and other electronic devices containing hazardous materials to be held responsible for educating consumers and the general public regarding the potential threat to public health and the environment posed by their products. At minimum, all computer monitors, television sets and other electronic devices containing hazardous materials must be clearly labeled to identify environmental hazards and proper materials management.

5.2 Hazardous Waste

As per Hazardous Waste Management rules 2016 the Urban Local bodies in Jharkhand will follow the rules as stated in that. The ULB will follow the rules and all the establishment under its jurisdiction will follow the rules specified in HWM 2016.

Remedial actions suggested

Several remedial actions has to be carried out so that the e-waste is managed properly in all the urban areas. The major actions is being mentioned below. The important steps to be taken for e-waste are

- i.) Responsibilities of the occupier for management of hazardous and other wastes
- ii.) Responsibilities of State Government for environmentally sound management of hazardous and other wastes
- iii.) Storage of hazardous and other wastes
- iv.) Responsibility and the role of the Industry

Responsibilities of the occupier for management of hazardous and other wastes. -

(1) For the management of hazardous and other wastes, an occupier shall follow the following steps, namely:-

- (a) Prevention;
- (b) Minimization;
- (c) Reuse,
- (d) Recycling;
- (e) Recovery, utilization including co-processing;
- (f) Safe disposal.

(2) The occupier shall be responsible for safe and environmentally sound management of hazardous and other wastes.

(3) The hazardous and other wastes generated in the establishment of an occupier shall be sent or sold to an authorized actual user or shall be disposed of in an authorized disposal facility.

(4) The hazardous and other wastes shall be transported from an occupier's establishment to an authorized actual user or to an authorized disposal facility in accordance with the provisions of these rules.

(5) The occupier who intends to get its hazardous and other wastes treated and disposed of by the operator of a treatment, storage and disposal facility shall give to the operator of that facility, such specific information as may be needed for safe storage and disposal.

(6) The occupier shall take all the steps while managing hazardous and other wastes to contain contaminants and prevent accidents and limit their consequences on human beings and the environment; and

(7) Provide persons working in the site with appropriate training, equipment and the information necessary to ensure their safety.

Responsibilities of State Government for environmentally sound management of hazardous and other wastes. -

(1) ULBs in collaboration with the Department of Industry in the State or any other government agency authorized in this regard by the State Government, will ensure earmarking or allocation of industrial space or shed for recycling, pre-processing and other utilization of hazardous or other waste in the existing and upcoming industrial park, estate and industrial clusters;

(2) ULB in collaboration with Department of Labor in the State or any other government agency authorized in this regard by the State Government shall,-

- (a) Ensure recognition and registration of workers involved in recycling, preprocessing and other utilization activities;
- (b) Assist formation of groups of such workers to facilitate setting up such facilities;
- (c) Undertake industrial skill development activities for the workers involved in recycling, pre-processing and other utilization;
- (d) Undertake annual monitoring and to ensure safety and health of workers involved in recycling, pre-processing and other utilization.

(3) Every State Government may prepare integrated plan for effective implementation of these provisions and to submit annual report to the Ministry of Environment, Forest and Climate Change, in the Central Government.

Storage of hazardous and other wastes. -

(1) The occupiers of facilities may store the hazardous and other wastes for a period not exceeding ninety days and shall maintain a record of sale, transfer, storage, recycling, recovery, pre-processing, co-processing and utilization of such wastes and make these records available for inspection:

Provided that the State Pollution Control Board may extend the said period of ninety days in following cases, namely:-

- (i) Small generators (up to ten tonnes per annum) up to one hundred and eighty days of their annual capacity;
- (ii) Actual users and disposal facility operators up to one hundred and eighty days of their annual capacity,
- (iii) Occupiers who do not have access to any treatment, storage, disposal facility in the concerned State; or
- (iv) The waste which needs to be specifically stored for development of a process for its recycling, recovery, pre-processing, co-processing or utilization;
- (v) In any other case, on justifiable grounds up to one hundred and eighty days.

Responsibility and Role of industries

1. Generators of hazardous wastes will take responsibility to determine the output characteristics of wastes and if hazardous, should provide management options.
2. All personnel involved in handling e-waste in industries including those at the policy, management, control and operational levels, should be properly qualified and trained. Companies can adopt their own policies while handling hazardous-wastes.
3. Companies working in the ULBs to adopt hazardous waste minimization techniques, which will make a significant reduction in the quantity of hazardous - waste generated and thereby lessening the impact on the environment.
4. Manufacturers, distributors, and retailers will have to undertake the responsibility of recycling/disposal of their own products.
5. Manufacturers and sellers of computer monitors, television sets and other electronic devices containing hazardous materials to be held responsible for educating consumers and the general public regarding the potential threat to public health and the environment posed by their products. At minimum, all computer monitors, television sets and other electronic devices containing hazardous materials must be clearly labeled to identify environmental hazards and proper materials management.

5.3 Bio – Medical/ Health-care waste

Of the total amount of waste generated by health-care activities, about 85% is general, non-hazardous waste comparable to domestic waste. The remaining 15% is considered hazardous material that may be infectious, chemical or radioactive.

Types of waste

Waste and by-products cover a diverse range of materials, as the following list illustrates:

- **Infectious waste:** waste contaminated with blood and other bodily fluids (e.g. from discarded diagnostic samples), cultures and stocks of infectious agents from laboratory work (e.g. waste from autopsies and infected animals from laboratories), or waste from patients with infections (e.g. swabs, bandages and disposable medical devices);
- **Pathological waste:** human tissues, organs or fluids, body parts and contaminated animal carcasses;
- **Sharps waste:** syringes, needles, disposable scalpels and blades, etc.;
- **Chemical waste:** for example solvents and reagents used for laboratory preparations, disinfectants, sterilants and heavy metals contained in medical devices (e.g. mercury in broken thermometers) and batteries;
- **Pharmaceutical waste:** expired, unused and contaminated drugs and vaccines;
- **Cytotoxic waste:** waste containing substances with genotoxic properties (i.e. highly hazardous substances that are, mutagenic, teratogenic or carcinogenic), such as cytotoxic drugs used in cancer treatment and their metabolites;
- **Radioactive waste:** such as products contaminated by radionuclides including radioactive diagnostic material or radiotherapeutic materials; and
- **Non-hazardous or general waste:** waste that does not pose any particular biological, chemical, radioactive or physical hazard.

The major sources of health-care waste are:

- hospitals and other health facilities
- laboratories and research centers
- mortuary and autopsy centers
- animal research and testing laboratories
- blood banks and collection services
- nursing homes for the elderly

Key elements in improving health-care waste management will be:

- promoting practices that reduce the volume of wastes generated and ensure proper waste segregation;
- developing strategies and systems along with strong oversight and regulation to incrementally improve waste segregation, destruction and disposal practices with the ultimate aim of meeting national and international standards;
- where feasible, favouring the safe and environmentally sound treatment of hazardous health care wastes (e.g. by autoclaving, microwaving, steam treatment integrated with internal mixing, and chemical treatment) over medical waste incineration;
- Building a comprehensive system, addressing responsibilities, resource allocation, handling and disposal. This is a long-term process, sustained by gradual improvements;
- raising awareness of the risks related to health-care waste, and of safe practices; and
- Selecting safe and environmentally-friendly management options, to protect people from hazards when collecting, handling, storing, transporting, treating or disposing of waste.

Government commitment and support is needed for universal, long-term improvement, although immediate action can be taken locally.

Based on the policy the Health department will address aspects such as regulatory framework, planning issues, waste minimization and recycling, handling, storage and transportation, treatment and disposal options, and training. The health department may assign an officer for management of health waste.

Duties and responsibilities of the Waste Management Officer.

The Waste Management Officer shall, in addition to his normal duties and responsibilities, be responsible for the day-to-day implementation and monitoring of the Waste Management Plan and in particular, shall –

- (a) for waste collection –
 - (i) play a major role to ensure internal collection of waste bags and waste containers and their transport to the central storage facility wherever possible;
 - (ii) give directions to the hospitals and other health facilities to ensure that an adequate supply of waste bags, containers, protective clothing and collection trolleys are available at all times;
 - (iii) give directions to ensure that sanitary staff and sweepers immediately replace used bags and containers with the new bag and containers of the same type on the required time or when it is full, and, where a waste bag is removed from container, that the container is properly cleaned before a new bag is fitted there in; and
- (b) for waste storage –
 - (i) ensure correct use of the central storage facility and that it is kept secured from unauthorized access; and
 - (ii) prevent unsupervised dumping of waste bags and waste containers on the hospital premises, even for short periods of time.
- (c) for waste disposal –
 - (i) co-ordinate and monitor all waste disposal operations, and for this purpose meet regularly with the concerned representative of the local council;
 - (ii) ensure that the correct methods of transportation of waste are used on-site to the central storage facility or incinerator if installed, and off-site by the local council; and
 - (iii) ensure that the waste is not stored on the hospital premises for longer than 24 hours, by coordinating with the incinerator operators and with the local council.
- (d) for incident management and control –
 - (i) ensure that emergency procedures are available and in place at all times and that all staff members are aware of the action to be taken by them;
 - (ii) investigate, record and review all incidents reported regarding hospital waste management; and
 - (iii) record the quantities of waste generated by each department on a weekly basis.

Health Waste Management Plan.

(1) The Health Waste Management Plan to be made and approved by the Health department.

(2) The Health Waste Management Plan shall include -

- (a) a plan of the hospital showing the waste disposal points for every ward and department, indicating whether each point is for risk waste or non-risk waste, and showing the sites of the central storage facility for risk waste and the central storage facility for non-risk waste;
- (b) details of the types, numbers and estimated costs of containers, plastic bags and trolleys required annually;
- (c) time-tables including frequency of waste collection from each ward and department;

- (d) duties and responsibilities for each of the different categories of hospital staff members who will generate hospital waste and be involved in the management of the waste;
- (e) an estimate of the number of staff members required for waste collection;
- (f) procedures for the management of wastes requiring special treatment such as autoclaving before final disposal;
- (g) contingency plans for storage or disposal of risk waste in the event of breakdown of incinerator, or of maintenance or collection arrangements;
- (h) training courses and programmes; and
- (i) emergency procedures.

(3) The representatives of the local hospitals responsible for the collection and disposal of waste from the hospital shall be consulted in drafting and finalization of the Waste Management Plan.

(4) The Waste Management Plan shall be regularly monitored, reviewed, and revised and updated by the Waste Management Team as and when necessary.

Waste segregation.

(1) Risk waste shall be separated from non-risk waste at source, that is at the ward bedside, operation theatre, laboratory, or any other room in the hospital where the waste is generated, by the doctor, nurse, or other person generating the waste.

(2) All disposal medical equipment and supplies including syringes, needles, plastic bottles, drips and infusion bags shall be cut or broken and rendered non-reusable at the point of use by the person using the same, or in case any such used equipment or supplies is found or comes to the possession of any person, by such person.

(3) All risk waste other than sharps, large quantities of pharmaceuticals, or chemicals, waste with a high content of mercury or cadmium such as broken thermometers or used batteries, or radioactive waste shall be placed in a suitable container made of metal or tough plastic, with a pedal type or swing lid, lined with a strong yellow plastic bag. The bags shall be removed when it is not more than three quarters full and sealed, preferably with self-locking plastic sealing tags and not by stapling. Each bag shall be labeled, indicating date, point of production/ward/hospital, quantity and description of waste, and prominently displaying the biohazard symbol. The bag removed should be immediately replaced with a new one of the same type.

(4) Sharps including the cut or broken syringes and needles shall be placed in metal or high-density plastic containers resistant to penetration and leakage, designed so that items can be dropped in using one hand, and no item can be removed. The containers shall be coloured yellow and marked "DANGER! CONTAMINATED SHARPS". The sharps container shall be closed when three quarters full. If the sharp container is to be incinerated, it shall be placed in the yellow plastic bag with the other risk waste.

(5) Large quantities of pharmaceutical waste shall be returned to the suppliers. Small quantities shall be placed in a yellow plastic bag, preferably after being crushed, where this can be done safely.

(6) Large quantities of chemical waste, and waste with a high content of mercury or cadmium shall not be incinerated, but shall be placed in chemical resistant containers and sent to specialized treatment facilities.

(7) Radioactive waste which has to be stored to allow decay to background level shall be placed in a plastic bag, in a large yellow container or drum. The container or drum shall be labeled, showing the radionuclide's activity on a given date, and the period of storage required, and marked 'RADIOACTIVE WASTE', with the radiation symbol. Non-infectious radioactive waste which has decayed to background level shall be placed in black plastic bags. Infectious radioactive waste which has decayed to background level shall be placed in yellow plastic bags. High level and relatively long half-life radionuclides shall be packaged and stored in accordance with instructions of the original supplier under supervision of the Radiology Officer, and sent back to the supplier for disposal.

(8) Non-risk waste shall be placed in a suitable container lined with a black plastic bag. Adequate numbers of non-risk waste containers shall be placed in all areas of the hospital and notices affixed to encourage visitors to use them.

5.4 Construction and Demolition Waste

The waste management rules 2016 shall apply to every waste resulting from construction, re-modeling, repair and demolition of any civil structure of individual or organisation or authority who generates construction and demolition waste such as building materials, debris, rubble.

- (a) **"construction and demolition waste"** means the waste comprising of building materials, debris and rubble resulting from construction, re-modeling, repair and demolition of any civil structure;
- (b) **"service provider"** means authorities who provide services like water, sewerage, electricity, telephone, roads, drainage etc. often generate construction and demolition waste during their activities, which includes excavation, demolition and civilwork;
- (c) **"waste generator"** means any person or association of persons or institution, residential and commercial establishments including Indian Railways, Airport, Port and Harbour and Defence establishments who undertakes construction of or demolition of any civil structure which generate construction and demolition waste.

Duties of the waste generator -

- (1) Every waste generator shall prima-facie be responsible for collection, segregation of concrete, soil and others and storage of construction and demolition waste generated, as directed or notified by the concerned local authority in consonance with these rules.
- (2) The generator shall ensure that other waste (such as solid waste) does not get mixed with this waste and is stored and disposed separately.
- (3) Waste generators who generate more than 20 tons or more in one day or 300 tons per project in a month shall segregate the waste into four streams such as concrete, soil, steel, wood and plastics, bricks and mortar and shall submit waste management plan and get appropriate approvals from the local authority before starting construction or demolition or remodeling work and keep the concerned authorities informed regarding the relevant activities from the planning stage to the implementation stage and this should be on project to project basis.
- (4) Every waste generator shall keep the construction and demolition waste within the premise or get the waste deposited at collection center so made by the local body or handover it to the authorized processing facilities of construction and demolition waste; and ensure that there is no littering or deposition of construction and demolition waste so as to prevent obstruction to the traffic or the public or drains.
- (5) Every waste generator shall pay relevant charges for collection, transportation, processing and disposal as notified by the concerned authorities; Waste generators who generate more than 20 tons or more in one day or 300 tons per project in a month shall have to pay for the processing and disposal of construction and demolition waste generated by

them, apart from the payment for storage, collection and transportation. The rate shall be fixed by the concerned local authority or any other authority designated by the State Government.

Duties of service provider and their contractors -

- (1) The service providers shall prepare within six months from the date of notification of these policy, a comprehensive waste management plan covering segregation, storage, collection, reuse, recycling, transportation and disposal of construction and demolition waste generated within their jurisdiction.
- (2) The service providers shall remove all construction and demolition waste and clean the area every day, if possible, or depending upon the duration of the work, the quantity and type of waste generated, appropriate storage and collection, a reasonable timeframe shall be worked out in consultation with the concerned local authority.
- (3) In case of the service providers have no logistics support to carry out the work specified in sub- rules (1) and (2), they shall tie up with the authorised agencies for removal of construction and demolition waste and pay the relevant charges as notified by the local authority.

Duties of local authority-The local authority shall, -

- (1) issue detailed directions with regard to proper management of construction and demolition waste within its jurisdiction in accordance with the provisions of these rules and the local authority shall seek detailed plan or undertaking as applicable, from generator of construction and demolition waste;
- (2) chalk out stages, methodology and equipment, material involved in the overall activity and final clean up after completion of the construction and demolition;
- (3) seek assistance from concerned authorities for safe disposal of construction and demolition waste contaminated with industrial hazardous or toxic material or nuclear waste if any;
- (4) shall make arrangements and place appropriate containers for collection of waste and shall remove at regular intervals or when they are filled, either through own resources or by appointing private operators;
- (5) Shall get the collected waste transported to appropriate sites for processing and disposal either through own resources or by appointing private operators;
- (6) shall give appropriate incentives to generator for salvaging, processing and or recycling preferably in-situ;
- (7) shall examine and sanction the waste management plan of the generators within a period of one month or from the date of approval of building plan, whichever is earlier from the date of its submission;
- (8) shall keep track of the generation of construction and demolition waste within its jurisdiction and establish a data base and update once in a year;

- (9) shall device appropriate measures in consultation with expert institutions for management of construction and demolition waste generated including processing facility and for using the recycled products in the best possible manner;
- (10) shall create a sustained system of information, education and communication for construction and demolition waste through collaboration with expert institutions and civil societies and also disseminate through their own website;
- (11) shall make provision for giving incentives for use of material made out of construction and demolition waste in the construction activity including in non-structural concrete, paving blocks, lower layers of road pavements, colony and rural roads.

5.5 Plastic Waste Management

Plastics have made significant contribution in almost every field of human activity today – agriculture, medical, transportation, piping, electrical and heat insulation, packaging, manufacturing of household and electronic goods, furniture and other items of daily or specific use. Plastics in medical products like disposable syringes, blister packing of tablets and capsules, joint replacement prostheses, inter venous (IV) fluid bottles, blood bags, catheters, heart valves, etc., have significantly helped supporting the human life. Medical devices made of plastics are implanted into the human body.

Packaging is one of the most important applications of plastics. In fact, about 40% of plastic materials worldwide are used in packaging applications. Plastics have contributed in creating a sustainable, hygienic, energy efficient, cost effective and environmental friendly packaging system. Versatility of plastics has allowed creating an efficient pilfer proof, hygienic and cost effective packaging of food products like milk, spices, edible oil, bread, confectioneries, rice, wheat flour, snack foods and various types of medicines. Plastics are used for packaging of toiletries, cosmetics and host of other consumer products of daily and special purpose use required all – rich or poor in urban cities or in the villages. This has been possible due to the following attributes of plastic materials: i. Safe and hygienic – inert and chemical resistance, ii. Light weight and non-breakability, iii. Excellent barrier properties - enhancing shelf-life, iv. Superior impact resistance, v. Sterilizable and resistance to bacterial and other microbial growth, vi. Transparency as well as opacity, vii. Lower fuel consumption and product loss during transportation.

Apart from the conventional recycling, which is popular in India, alternate processes of plastic recycling are also required to be encouraged. Low-end, mixed and comingled plastics waste can be used safely for co-processing in cement kilns. Industrial fuel can be produced from all types of mixed plastics waste. Plastic waste has been used to construct asphalt roads. All these processes have been successfully tried and established in Indian conditions. Adherence for abiding to safe norms while recycling, as stipulated by the regulatory authorities, is a must. Proper education, facility, incentives and awareness can achieve this goal.

Types of Plastics and their Major Applications

The various types of plastics and their major applications are as follows:

Thermoplastics: These types of plastics become soft when heated, they can be moulded or shaped with pressure when in plastic state and, when cooled, they solidify

and retain the shape or mould. Some common thermoplastics with their uses and properties are as follows: -

Polyethylene terephthalate (PET): Some common properties are: i. Tough and clear, good strength and stiffness, chemical and heat resistant, good barrier properties for oxygen and carbon dioxide. ii. It is used in packaging, soft drink and mineral water bottles, fibres for clothing, films, food containers, transport, building and appliance industry (as it is fire resistant), etc.

High density polyethylene (HDPE): Some common properties: i. Good process ability, excellent balance of rigidity and impact strength, excellent chemical resistance, crystalline, melting point (130-1350C), and excellent water vapour barrier properties. ii. Used for making blow moulded products (various types of containers, water bottles), pipes, injection moulded products (storage bins, caps, buckets, mugs), films(carrier bags), etc.

Polyvinyl chloride (PVC):

Its properties are: i. Versatility, energy saving, adaptability to changing time and environment, durability, fire resistance. ii. It is used in industries such as building and construction, packaging, medical, agriculture, transport. Also used for making wires and cables, furniture, footwear, domestic appliances, films and sheets, bottles, etc.

Low density polyethylene (LDPE): Characteristics of LDPE are: i. Easy process ability, low density, semi crystalline nature, low melting range, low softening point, good chemical resistance, excellent dielectric properties, low moisture barrier, poor abrasion and stretch resistance. ii. It is used for making carrier bags, heavy duty bags, nursery bags, small squeeze bottles. Also used in milk packaging, wire and cable insulation, etc.

Polypropylene (PP): Properties are: i. Low density, excellent chemical resistance, environmental stress resistance, high melting point, good process ability, dielectric properties, low cost, creep resistance. ii. Used for making bottles, medical containers, pipes, sheets, straws, films, furniture , house wares, luggage, toys, hair dryer, fan, etc.

Polystyrene (PS): Some of the properties of polystyrene are: i. Glassy surface, clear to opaque, rigid, hard, high clarity, affected by fats and solvents. ii. Used for making electrical and communication equipment's e.g. plugs, sockets, switch plates, coil forms, circuit boards, spacers and housings. Also used for making containers, toys, wall tiles, baskets, cutlery, dishes, cups, tumblers, dairy containers, etc.

Others plastics: There are many other types of plastics except these six types, often used in the engineering sector. Examples include polycarbonate (PC), nylon, and acrylonitrile butadiene styrene (ABS).

Thermosets:

Thermosetting materials are those which once set cannot be remolded/softened by applying heat. It includes phenol, melamine and urea formaldehyde, unsaturated polyester, epoxy and polyurethanes. These materials are not recyclable. The management of plastic waste is to be planned in such a manner that the plastic waste

generated from various sources is suitably taken care of. The various sources of plastic waste are shown in figure 1.

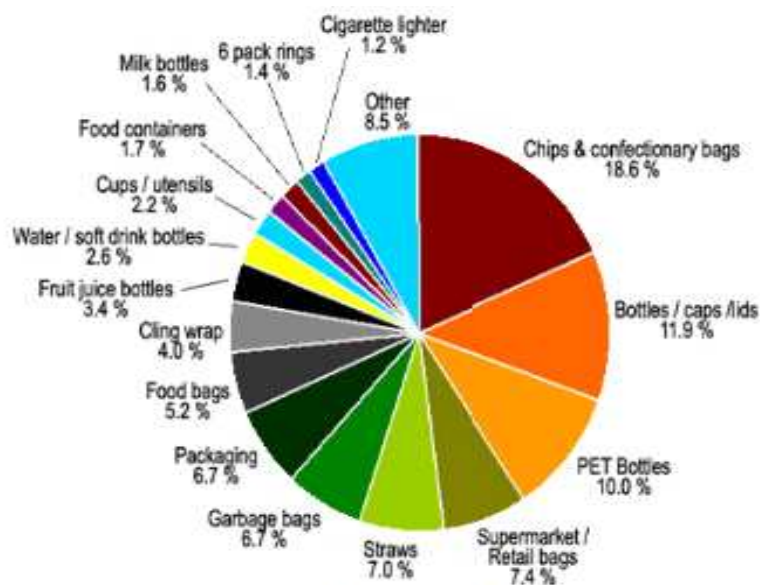


Figure-1
Sources of Plastic Waste

An overview of plastic waste management is exhibited in figure 2. The conventional and new technologies adopted for plastic waste management are summarized here.

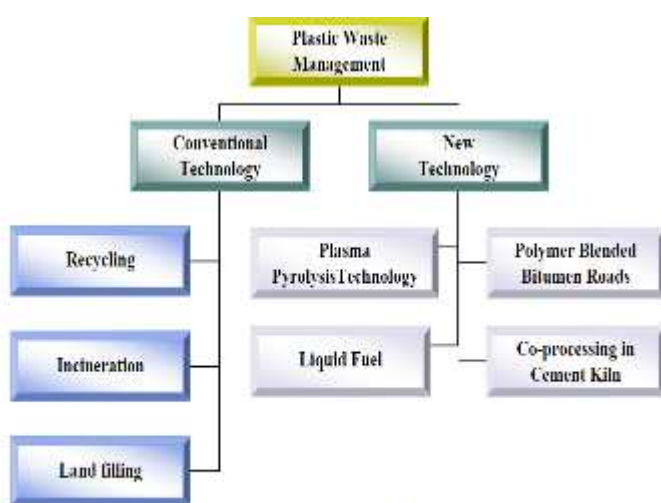


Figure-2
An Overview of Plastic Waste Management

Conventional Technology for Plastic Waste Management

The conventional technology for plastic waste management involves recycling, landfilling and incineration.

What needs to be done for its management in Jharkhand?

Recycling of plastics through environmentally sound methods:

Recycling of plastics will be carried out in such a manner that it minimizes the pollution level throughout the process and, as a result, increase the efficiency of the process and conserve the energy. Plastic recycling technologies have been divided into four general types-primary, secondary, tertiary and quaternary.

Primary recycling will include processing of scrap/waste into a product with features similar to the original product.

Secondary recycling will involve processing of waste plastics into products that have characteristics dissimilar from those of original plastic products.

Tertiary recycling, wherever possible basic chemicals and fuels will be produced from plastic scrap as part of the municipal waste stream or as a segregated waste.

Steps Involved in the Recycling Process are:

Selection: The recyclers will select the wastes which are suitable for recycling.

Segregation: The plastic will be segregated as per the codes stated in the BiS guidelines (IS:14534:1998).

Processing After selection and segregation, the pre-consumer waste shall be recycled directly. The post-consumer waste (used plastic waste) shall be washed, shredded, agglomerated, extruded and granulated.

Landfilling:

This is a traditional approach to waste management, but space for constructing landfills is becoming limited in Jharkhand. The landfill option will be slowly avoided and the plastic recycling will be encouraged.

Incineration:

This process lessens the need for landfilling of plastics wastes, but, there are worries that hazardous materials may be released into the atmosphere during this process. For example, halogenated additives and PVC are usually present in mixed plastic waste which leads to the threat of dioxins, furans and other polychlorinated biphenyls being released into the environment. Only the hospital waste will be incinerated in a controlled manner so as to reduce the pollution due to off-gas as it is not advisable to recycle it.

The Recent Technologies for Plastic Waste Management will be applied

The recent technologies for plastic waste management are listed here.

Polymer Blended Bitumen Road: The process of road laying using waste plastics is designed and the technique is being implemented successfully for the construction of flexible roads at various places in Jamshedpur. The same option will be explored in other cities/towns also. A brief description is given in the schematic diagram shown in figure 3.



Figure-3
Schematic flow diagram of plastic coated bitumen road construction

Co-processing of plastic waste as an Alternative Fuel and Raw Material (AFR): Co-processing refers to the utilization of waste materials in industry process such as cement, production of lime or steel and power stations or any other large combustion plants. Co-processing shows replacement of primary fuel and raw material by waste recovering industry and material from waste. As Jharkhand is having a lot of industries the option will be explored and put to use.

Co-processing of Plastic waste in Cement Kiln: One of the most effective methods of recycling of plastics waste for recovery of energy is its use as an alternative fuel in cement kilns. Apart from recycling of plastic for making new products and saving energy, these will also be used to turn plastic into new energy sources. Plastic is prepared from crude oil, which is the same raw material from which fuel is made. With the help of this method, waste plastic will not be put to actual use, but it will help to save the scarce crude oil resources left on earth. The high temperature used in the cement kilns gives a scope for use of even some type of plastic waste contaminated with toxic chemicals like pesticides and some other hazardous materials without creating any increased emissions in the air or water. No segregation or cleaning is required for such type of disposal. Low-end plastic waste, which creates a waste management problem, may provide the vital energy to the cement industry. Jharkhand cement industry will be encouraged to use this resource.

Plasma Pyrolysis Technology (PPT): Plasma Pyrolysis is a technology, which put together the thermo-chemical properties of plasma with the pyrolysis process. The extreme and versatile heat generation ability of plasma pyrolysis technology enables it to dispose of all types of plastic waste. This technology will be put to use after discussion with the stakeholders.

Process Technology: In Plasma Pyrolysis, initially the plastic waste is fed into the primary chamber at 8500° C through a feeder. The waste material dissociates into carbon monoxide, hydrogen, methane, higher hydrocarbons etc. Induced draft fan drains the pyrolysis gases and plastic waste into the secondary chamber. In this chamber, the pyrolysis gases are combusted in the presence of excess air. The inflammable gases catch fire because of high voltage spark. The temperature in the

secondary chamber is maintained at 10500^o C. The hydrocarbon, hydrogen and CO are combusted into water and safe carbon dioxide. Conditions are maintained such that it eradicates the possibility of formation of toxic gases. The conversion of organic waste into non toxic gases (CO₂, H₂O) is more than 99%. The excessive conditions of plasma kill stable bacteria such as bacillus stereo-thermophilus and bacillus subtilis right away. Segregation of the waste is not necessary, since very high temperatures make sure the treatment of all types of waste without discrimination.

Conversion of Plastics Waste into Liquid Fuel: This technology is not very complicated. As feedstock, it can accept a broad range of plastics, including those that are unwashed, unsorted, or which are hard to recycle. Once the material is obtained, it can be cut up into small pieces prior to its utilization, but current advancements have led to the capability of putting larger pieces of plastic directly into the system. To start the process, waste is laden into a hopper with a forklift.

The materials which can be loaded include plastic car bumpers, fuel tanks, product packaging, component holders, agricultural film, and pharmaceutical packaging. Natural gas is burnt to generate heat and get the process started once the hopper is in the reactor. At this point a catalyst helps in breaking the plastic hydrocarbons into shorter chain of molecules. The off-gases that are not going to be collected as fuel are used to produce heat and keep the process going. The fuel oil and diesel are condensed from a gaseous state into a liquid state, which are collected as the process continues. They are placed into temporary fuel tanks. The process is controlled by an automated system.

5.6 Batteries (Management & Handling) Rules 2001

Batteries comes under the Hazardous Material and will be guided by Hazardous Waste Management Rules 2016. The specific provisions made under the said rule will be adopted in the state.

Mechanism of Implementing the Rules under the policy

The rules provide that manufacturers, dealers, assemblers, re-conditioners, auctioneers, bulk-consumers, authorised recyclers and importers have to file half yearly returns on sale, collection of used batteries and quantity sent to registered/authorised recyclers.

The rules also provide for registration/authorisation of dealers by SPCBs and registration of importers by CPCB. Dealers, who are key stakeholders in these roles have to file half yearly returns to manufacturers, who in turn have to file compiled half yearly returns to SPCBs. Manufacturers are required to manage channelization through their dealer network and also through their collection centres. One of the main responsibilities of manufacturers is also to create awareness among the consumers and to implement take-back system for the end of life batteries produced by them.

There is no provision of registering/authorising manufacturers, assemblers, re-conditioners, auctioneers and bulk-consumers by SPCBs, therefore SPCBs may have to acquire data about manufacturers on their own, which may include market survey, creating awareness and vigilance mechanism. (However, provisions for developing registry of manufacturers, assemblers, re-conditioner, bulk-consumers and auctioneers not specified under Rules)

5.7 IMPLEMENTATION OF THE POLICY

The Urban Development & Housing Department (UD&HD) of the Government of Jharkhand will be responsible for developing a strategy to implement the policy covering all the 10 outcomes, along with the necessary institutional framework, provisions and guidance for planning, monitoring, evaluation capacity building and funding.

Order: It is hereby ordered that the copy of this resolution be published in the Special Gazette and wide publicity be given and circulated among all Department/Head of the Department.

By order of the Governor of Jharkhand,

Ajay Kumar Singh,

Secretary to Government.
